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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/875,474	06/06/2001	Raul E. Sequeira	CE08236R	7955

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MOTOROLA, INC.  
1303 EAST ALGONQUIN ROAD  
IL01/3RD  
SCHAUMBURG, IL 60196

EXAMINER

ODOM, CURTIS B

ART UNIT PAPER NUMBER

2634

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/875,474

Applicant(s)

SEQUEIRA, RAUL E.

Examiner

Curtis B. Odom

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 4/21/2005 have been fully considered but they are not persuasive. Examiner cites differences between the prior art reference and the present application; however, the cited differences are not with regards to the claimed limitations. Thus, the claims of the present application do not constitute patentability over previously cited Ariyavisitakul et al.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ariyavisitakul et al. (previously cited in Office Action 3/4/2005), hereinafter referred to as Reference A.

Regarding claim 1, Reference A discloses a method of interference cancellation comprising:

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receiving (Fig. 2, column 5, lines 30-47 and column 6, lines 13-25) a signal including at least a first data component (data) and a second data component (channel corruption or ISI) on a communication channel;

determining (column 4, line 1-column 6, line 25) a characteristic (Equation 8,  $\gamma$ , which is the signal to ISI-plus noise ratio) of the communication channel;

estimating (column 4, line 1-column 6, line 25) an interference factor (Equation 11) caused by the second data component (ISI) on a communication channel based on based upon the characteristic;

using (column 6, lines 13-25) the interference factor to cancel the second data component from the signal; and

recovering (Fig. 2, block 70, column 5, lines 30-47) the first data component from the signal.

Reference A does not disclose the interference cancellation takes place in a multiple access communication channel. However, Reference A does disclose the interference cancellation takes place in broadband wireless (multicarrier) systems. CDMA systems and TDMA systems are broadband wireless (multicarrier) systems which utilize multiple access channels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Reference A could have been implemented into a CDMA or TDMA system without changing the functionality of the device. Thus, claim 1 does not constitute patentability.

Regarding claim 2, which inherits the limitations of claim 1, Reference A discloses the interference factor comprises one of a data estimate (Equation 11,  $y_n$ , column 4, lines 1-11)) and a partial interference coefficient (Equation 11,  $x_n$ ).

Regarding claim 3, which inherits the limitations of claim 1, Reference A does not disclose the signal comprises a spread spectrum code division multiple access system signal. However, Reference A discloses that the operation can be performed on any signal which experiences fading and ISI (column 3, lines 3-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that since a spread spectrum code division multiple access system signal is subject to fading and ISI, that the method as described by Reference A could have been performed on this type of signal. Thus, claim 3 does not constitute patentability.

Regarding claim 4, which inherits the limitations of claim 1, Reference A discloses the step of estimating comprises applying a function to the characteristic (Equation 8 and Equation 11).

Regarding claim 5, which inherits the limitations of claim 4, Reference A discloses the function comprises a piece-wise linear estimation of the hyperbolic tangent (Equation 11, column 6, lines 13-25).

Regarding claim 6, which inherits the limitations of claim 4, Reference A discloses the function comprises a piece-wise linear estimation of a probability of error function (Equation 8).

Regarding claim 7, which inherits the limitations of claim 1, Reference A discloses the characteristic comprises one of a signal estimation and a noise estimation (see Equation 8 and 11, K).

Regarding claim 8, Reference A discloses a receiver (Fig. 2) including interference cancellation, wherein the receiver is adapted to receive a signal including a first data component (data) and a second data component (ISI), a method of providing a data estimate comprising the steps of:

estimating ( $\gamma$ , column 6, lines 26-28) a signal-to-noise ratio for the signal;

applying (Equation 11, column 6, lines 13-25) a function to the signal-to-noise ratio to determine a soft data estimate caused by the second data component (ISI) received on a communication channel on a power control group by power control group (wherein  $y_n$ , which represents the currently soft-decided signal, represents the power control group, see column 4, lines 1-11 and column 5, lines 48-55) for each of the first data component and the second data component, wherein the soft data estimate (Equation 11) includes both the first data component and the second data component;

subtracting (column 6, lines 13-25) from the signal a signal estimate involving the soft data estimate of the second data component, wherein subtracting the soft data estimate including the ISI removes the ISI from the signal.

Reference A does not disclose the interference cancellation takes place in a multiple access communication channel. However, Reference A does disclose the interference cancellation takes place in broadband wireless (multicarrier) systems. CDMA systems and TDMA systems are broadband wireless (multicarrier) systems which utilize multiple access channels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Reference A could have been implemented into a CDMA or TDMA

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system without changing the functionality of the device. Thus, claim 1 does not constitute patentability.

Regarding claim 9, which inherits the limitations of claim 8, Reference A discloses the step of estimating a signal-to-noise ratio (column 5, lines 8-19) comprises estimating a first signal term (signal power) and second signal term (noise/ISI).

Regarding claim 10, which inherits the limitations of claim 8, Reference A discloses the function comprises a piece-wise linear estimation of the hyperbolic tangent (column 6, lines 13-25, Equation 11).

Regarding claim 11, Reference A discloses in a receiver including partial interference cancellation (Fig. 2), the receiver is adapted to receive a signal including a first data component (signal) and a second data component (ISI), a method of providing a partial interference coefficient comprising the steps of:

estimating ( $\gamma$ , signal-to-ISI plus noise ratio, column 6, lines 26-28) a first signal term (signal) and a second signal term (ISI) of the signal;

applying (Equation 8) a function to a signal-to-noise ratio to determine an intermediate parameter caused by the second data component (ISI) received on a communication channel on a power control group by power control group basis, wherein the probability is based on  $\gamma$ , which includes the second data component;

using (Equation 11, column 4, lines 1-25) the intermediate parameter to determine a partial interference cancellation coefficient ( $x_n$ ).

Reference A does not disclose the interference cancellation takes place in a multiple access communication channel. However, Reference A does disclose the interference

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cancellation takes place in broadband wireless systems. CDMA systems and TDMA systems are broadband wireless systems which utilize multiple access channels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that Reference A could have been implemented into a CDMA or TDMA system without changing the functionality of the device.

Regarding claim 12, which inherits the limitations of claim 11, Reference A discloses using the intermediate parameter to determine a second partial interference cancellation coefficient (Equation 8, column 4, line 1-column 5, line 19, wherein the intermediate parameter uses past intermediate parameters to determine its value (see column 4, line 50-column 5, line 15). Thus, the value of a second intermediate parameter used to calculate a second partial interference coefficient (Equation 11) would take into account the value of the first intermediate parameter used to calculate the first partial interference coefficient.

Regarding claim 13, which inherits the limitations of claim 11, Reference A discloses the function comprises a piece-wise linear estimation of a probability of error function (Equation 8).

Regarding claim 14, which inherits the limitations of claim 2, Reference A discloses the partial interference cancellation coefficient (Equation 11) is based on estimates of the received signal that involves the first data component ( $y_n$ ) and a channel estimate ( $\gamma$ ).

Regarding claim 15, which inherits the limitations of claim 8, Reference A discloses the partial interference cancellation coefficient (Equation 11) is based on estimates of the received signal that involves the first data component ( $y_n$ ) and a channel estimate ( $\gamma$ ).



Regarding claim 16, which inherits the limitations of claim 11, Reference A discloses the partial interference cancellation coefficient (Equation 11) is based on estimates of the received signal that involves the first data component ( $y_n$ ) and a channel estimate ( $\gamma$ ).

### *Conclusion*

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee et al. (U. S. Patent No. 6, 400, 750) discloses a transmission method using multicarrier CDMA.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom  
September 29, 2005



**STEPHEN CHIN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**